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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/691,761      | 10/23/2003  | Jeffrey A. Nielsen   | 200309747-1         | 6690             |

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EXAMINER

LAMBELET, LAWRENCE EMILE

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1732

DATE MAILED: 09/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                                      |                                       |  |
|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/691,761 | <b>Applicant(s)</b><br>NIELSEN ET AL. |  |
|                              | <b>Examiner</b><br>Lawrence Lambelet | <b>Art Unit</b><br>1732               |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 10-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-9, drawn to method of producing a three-dimensional object, classified in class 264, subclass 308.
- II. Claims 10-16, drawn to apparatus for practicing method, classified in class 425, subclass 375.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used to practice another and materially different process wherein the planing step is eliminated and the criteria is adjusted to level each layer.

Because these inventions are independent or distinct for the reasons given above and have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Brad Haymond on 8/23/2006 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-9.

Affirmation of this election must be made by applicant in replying to this Office action.

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Claims 10-16 are withdrawn from further consideration by the examiner, 37

CFR 1.142(b), as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 102***

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as anticipated by Crawford (U.S. Patent 6,936,212).

Crawford discloses a method of producing a three-dimensional object, as recited in claim 1. Crawford teaches a selective deposition modeling (SDM) process wherein a shell structure (shell layer) and an internal lattice (interior layer) are differentiated in layer formation, as shown in the Abstract. Further, the formation of layers is scripted by computer data (criteria) as shown at lines 44-53 in column 3. Referring to Fig. 4 and the text passage at lines 35-48 in column 7, it can be shown that layers consisting only of shell (partial) and other layers consisting of both shell and interior (complete) are combined in a stack configuration according to scripting, and that the base layer and another layer following a shell and interior combo layer are shell only in composition. Crawford further teaches that a planarizer is used to normalize layers at lines 38-43 in column 10.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crawford as applied to claim 1 above, and further in view Kerekes (U.S. Patent 6,492,651).

Crawford teaches the method of claim 1, as discussed above.

Crawford does not teach monitoring waste and modifying criteria, as required by claims 2 and 7, or modifying through the determination of height criteria, as required by claim 3. Crawford further does not teach calibration criteria based on average heights of shell and interior layers, as required by claim 4.

Kerekes teaches monitoring height data across a layer surface to determine low areas and provide modification to criteria through feedback data. This is shown at lines 9-17 in column 4. The result of this feedback is to avoid depositing material which would be wasted in any normalization process. In this way, monitoring height data constitutes a waste monitoring process.

Kerekes teaches that sample points are used to represent an area or region at lines 14-57 in column 7. These sample points, illustrated by reference characters (26) and (32) in Fig. 3, can be said to represent the average height of a contiguous region. Such sample points can be combined into broader regional averages, and averages representing shell and interior regions can be compared. In effect, the process steps (16) and (18) in Fig. 2 translate such a comparison into calibration criteria directing new deposition of material in a closed loop manner. It would have been obvious to one of

ordinary skill that the result would be the same as an open loop calculation, such as that of the instant claim 4, based on the same measurement data.

Crawford and Kerekes are combinable because they are concerned with a similar technical field, namely, SDM. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Crawford the monitoring process of Kerekes, and would have been motivated to do so to decrease the build time by eliminating excess deposit of material.

Crawford does not teach selective deposition of interior voxels, or different combinations of voxels by layer, as required by claims 5 and 9. Crawford further does not teach less than 100% of interior voxels for each layer, as required by claim 6.

Kerekes teaches that layer-by-layer feedback is provided based on height data to selectively deposit new build material. This is shown at lines 24-45 and 65-67 in column 3, 1-2 and 63-65 in column 4, 1-13 and 35-57 in column 7, 48-64 in column 10, in the Abstract, and in claim 1 of the reference. Because of the dimensional variability in the build, and because the method is directed to detecting and filling low spots, it is evident that different combinations of interior voxels will be applied to each layer. Such variability is discussed at lines 49-54 in column 1. Kerekes further teaches that layers will be partially provisioned (less than 100% of the interior voxels) according to feedback data as shown at lines 10-17 in column 4.

Crawford and Kerekes are combinable because they are concerned with a similar technical field, namely, SDM. One of ordinary skill in the art at the time of the invention would have found it obvious to include in the method of Crawford the discrete

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deposition technique of Kerekes, and would have been motivated to do so to save material.

Crawford teaches the method of forming and planing, as required by claim 8.

The discussion regarding this is the same as that for claim 1 above.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following document is cited to further show the state of the art with regard to waste-efficient SDM systems:

U.S. Patent 7,0740,29 to Stockwell et al


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lawrence Lambelet whose telephone number is 571-272-1713. The examiner can normally be reached on 8 am-4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LEL  
8/29/2006

  
**CHRISTINA JOHNSON**  
**PRIMARY EXAMINER**  
8/31/06